FINDINGS AND RECOMMENDATIONS OF THE CRANE ACCIDENT WORKGROUP*

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**Views represented in this report are of the Workgroup and not necessarily that of MMS*

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The Engineering and Operations Division (EOD) formed a workgroup in May 1998 to analyze recent crane accidents and examine crane safety issues. The workgroup was also charged to review Minerals Management Service (MMS) regulations and to examine what actions we could take to improve the safety of crane operations. The workgroup consists of a representative from each of the three branches in EOD (Bill Hauser, Bill Lewis, and Wilbon Rhome). The following discussion summarizes the workgroup's review of recent crane accidents and trend analysis; discusses MMS' as well as the United States Coast Guard's (USCG) regulatory requirements for cranes; and recommends possible actions for improving crane safety.

REVIEW OF RECENT CRANE ACCIDENTS

1998 Incidents

There have been two very serious accidents involving cranes on the Outer Continental Shelf (OCS) so far in 1998.[1] The first serious accident occurred on May 10 when a platform crane failed while offloading a rental crane and killed two workers. Ocean Energy is the operator of the platform. Although this accident is still under investigation, the early indication is that the crane was poorly maintained and that mechanical failure contributed to the accident.

The second serious accident occurred on June 2 and it too involved the offloading of a rental crane. This event differed from the first accident in that the operation of a crane did not factor into the accident. The apparent cause of this accident was the improper disassembly of the rental crane (human error - lack of proper training, preparation, and supervision). One worker was killed and three others were seriously injured. Amoco is the operator of the platform and Sundowner is the contractor that was offloading the crane.

There have been at least six other minor incidents that involved crane operations in 1998. Three incidents caused significant damage to crane booms when equipment failed or the operator made an error. Two other incidents appear to have been caused by improper or poor techniques by "riggers" on supply boats. (For this report, riggers are personnel that attach or unhook loads or otherwise assist with crane operations. In many cases a rigger is a roustabout, roughneck, or a deckhand on a work or supply boat. In giving these personnel this job "title," we are not implying that they have any specialized skills or training to perform this job.) One of these incidents resulted in a minor injury and the other caused the spillage of 400 gallons of motor oil. The last incident caused no damage or injuries when a fast line parted.

Another incident should be included with these 1998 cranes incidents because it involves the hoisting of materials. This accident involved a hoist used to move a blowout preventer (BOP) stack and resulted in the year's first fatality (February 6). A roughneck was pinned between the BOP stack and a structural beam after one of the hoist's wire ropes failed. Apparently the wire rope had corroded, possibly leading to its failure.

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[1]On October 27, 1998, another serious crane accident occurred. The crane operator was killed when the crane broke from its pedestal while lifting a load. This accident is not included in the report.

1997 Incidents

There were at least 10 crane incidents in 1997 according to Accident/Incident forms and Accident Investigation Reports (referred to as reports for the rest of this paper) contained in our Technical Information Management System (TIMS). Incidents ranged from minor personnel injuries and minor property damage to two accidents resulting in two fatalities.

Crane pedestals failed on two occasions causing major damage to the cranes and one serious injury. Mechanical failure caused these two incidents.

Two other incidents damaged crane booms as a result of improper lifting techniques. One boom failed due to overloading because the wrong boom angle was used to offload a rig. In the other, the boom damage occurred when the boom pawl brake failed and the boom pivoted to the surface of the Gulf. Both of these incidents may have been caused by crane operator error. Fortunately there were no injuries in these two incidents.

Slings were involved in three incidents. Twice slings failed during the lifting operation, one failure resulted in a fatality. In that fatality, the floorhand handling the tag line was underneath the load when the sling failed. A second fatality occurred when a sling snagged and broke off the valve on an accumulator bottle and the escaping pressure blew the rigger across the rig floor. According to the report, the probable cause of this accident was that the communication between the crane operator and the rigger was not appropriate.

The other three incidents involved minor injury to a rigger, minor injury to a person exiting a personnel basket, and minor damage to an offloaded box of cuttings. These incidents are likely due to human error.

1996 Incidents

There were at least ten crane incidents in 1996. Severity of the incidents ranged from minor injuries and property damage to broken legs. There were no fatalities associated with crane operations in 1996. Improper lifting and mishandling loads (including personnel baskets) accounted for five of the accidents. One personnel basket got snagged and dumped a worker out of the basket. Two other personnel basket incidents resulted in workers breaking their legs, one was exiting the basket during rough seas and the other when the crane line slipped.

Mechanical failures resulted in two incidents. In one incident, a rigger was struck by a falling cable after the anti-two blocking device failed. Apparently this device may have been damaged during previous heavy lifts but was not repaired. The other mechanical failure involved the failure of the crane turntable.

Three incidents involved human error. One involved a helicopter that clipped a crane boom. The crane operator erred when he left the boom in wrong position after completing the crane operations (helicopter pilot also erred by not properly judging landing clearances). Another occurred when a new operator dropped a mud logging lab on a work boat. The last incident involved the lack of communication between a crane operator and personnel on a work boat. This incident damaged a diesel transporter tank and resulted in a minor oil spill.

1995 Incidents

We found only five crane incidents for 1995. One incident resulted in the fatality of a worker as he was lowered by a crane to detach the mooring lines of a work boat. The worker fell into the

Gulf and drowned when the cable which the worker was attached to slipped off the crane hook. Apparently the crane hook was not equipped with a proper safety latch to prevent the cable from slipping off the hook. Another sling slipped off the hook when a load shifted, fortunately this resulted in only minor damage.

On two separate incidents riggers were injured when their fingers were caught between loads being moved by cranes. The last incident resulted in 12 barrel diesel spill when a tank was ruptured while offloading a snubbing unit during bad weather.

Attachment 1 summarizes all of the above mentioned incidents. There may have been other crane incidents during these years, but we did not find them in the TIMS database. In addition, we reviewed some other incident reports where it was not readily apparent that a crane was actually involved. For example, a drum of diesel fuel was dropped in the Gulf, but the form did not state what activity caused the drum to fall into the Gulf. This incident may have occurred while a crane was loading or offloading of the drum or it could have happened while it was being moved with a hand truck.

TREND ANALYSIS

We reviewed the information available for the 34 incidents from 1995 to present (34 Accident/Incident/Pollution Forms and 20 reports) to try to categorize the types of crane incidents that occur on the OCS and to see if we could identify trends among the incidents. Here are the categories that we looked at:

- equipment failures by type (i.e., booms, pedestals, slings);
- human error incidents;
- frequency of injuries (and fatalities); and
- injuries by job types.

EQUIPMENT FAILURE BY TYPE

Equipment failure was listed as the cause of 17 out of 34 incidents. The types of equipment, number of failures, and fatalities and damage associated with each type of equipment failure are listed below in Table 1:

TABLE 1 - EQUIPMENT FAILURE BY TYPE

Equipment type	Number of failures	Number of fatalities	Property damage associated with failures
Wire rope	3	1	Minor damage
Boom equipment	3	0	Major damage to the booms
Crane pedestal	3	0	Major damage to cranes
Boom	2	2 (in one incident)	Major damage to the booms
Sling	2	1	Minor damage
Crane hook	2	1	Minor damage in one incident

Equipment type	Number of failures	Number of fatalities	Property damage associated with failures
Line slippage	1	0	No damage
Oil storage tank	1	0	Minor damage and minor oil spill

The forms and reports also indicated that when booms, boom equipment, and crane pedestals failed, it often resulted in significant damage to the cranes.

Trend - One type of equipment does not seem to fail more often than another type of equipment. However, the analysis shows that when equipment fails, the results can be deadly and cause significant damage to the crane and surrounding facilities. The root causes for the equipment failures were not usually stated in the reports.

HUMAN ERROR INCIDENTS

Human error was listed as the cause of 12 out of 34 incidents. We looked at the injuries and damage that resulted from human error and compared that to the injuries and damage resulting from equipment failure incidents. Tables 2 and 3 below show the injury and damage results from the 12 incidents that were attributed to human error.

We also looked at determining what job type was responsible for making the error that lead to the incident. The personnel that can make human errors associated with crane incidents are crane operators, riggers, and other personnel involved in the crane activity (such as workers in a personnel basket). Unfortunately it was not possible to clearly determine who was responsible for causing most of these incidents. Ultimately, the crane operator is responsible for the safety of each lift.

TABLE 2 - INJURIES/FATALITIES RESULTING FROM HUMAN ERROR INCIDENTS

Number of incidents	Injuries and fatalities
7	No injuries
4	Minor injuries (includes broken bones and severed finger)
1	One fatality

TABLE 3 - DAMAGE RESULTING FROM HUMAN ERROR INCIDENTS

Number of incidents	Property damage
3	No property damage
6	Minor property damage
1	Major property damage
2	Minor oil spills (no environmental damage)

Trend - Human error incidents had only one fatality out of 12 incidents (8%), while there were five fatalities associated with the 17 equipment failure incidents (29%). Major property damage

occurred once with the human error incidents (8%), while major property damage occurred in six of 17 equipment failure incidents (35%). Judging from this information, incidents attributed to human error appear to much less likely to cause fatalities (8% to 29%) and result in major damage (8% to 35%) than incidents caused by equipment failures.

Three incidents attributed to bad weather could also be considered as human error incidents if the crane operator erred in judgement to make the lift despite the poor weather conditions. However, there was not enough information to make that determination. There were no significant injuries or damage associated with the bad weather incidents.

FREQUENCY OF INJURIES/FATALITIES

Nineteen incidents had at least some type of injury. Seven fatalities are associated with six incidents. The other 13 incidents had serious, moderate, or minor injuries. (We noted that there does not seem to be consistent definitions for serious, moderate, and minor injuries. For this report, severed fingers and broken bones are considered minor injuries.) Fifteen incidents did not cause any injuries.

Trend - Injuries occur with more than half (19 out of 34 or 56%) of the crane incidents. Injuries are often serious and fatalities are not uncommon.

INJURIES BY JOB TYPE

We identified four types of workers (job types) that could be injured in a crane incident: 1) crane operator; 2) riggers, roustabout, floorhand, work boat deck hand, or other person assisting with the crane operations (all categorized as riggers in this section); 3) personnel in personnel basket; and 4) personnel not associated with the crane operations. There were seven fatalities and 20 injuries.

TABLE 4 - INJURIES/FATALITIES BY JOB TYPE

Job type	Number of incidents	Number of injuries and fatalities
Crane operators	2	2 minor injuries (includes broken bones)
Riggers	11	6 fatalities 10 injuries ranging from minor to serious
Personnel basket	4	4 minor injuries (includes 2 broken legs)
Personnel not involved with crane operations	2	1 minor injury (broken leg). Another incident involved the removal of a rental crane and it resulted in 1 fatality and 3 serious injuries

Trend - Riggers appear to be at a much greater risk of injury and death than any other personnel during crane operations.

SUMMARY OF TREND ANALYSIS

As you can see, crane accidents can be very serious. Equipment failure or human error can lead to death. We believe the most significant finding of our analysis is that riggers appear to be at the greatest risk during crane operations. Seven fatalities have occurred since January 1995, all of which involved riggers or other personnel working around cranes. Crane operators appeared to be less at risk because they were not among any of the fatalities, nor did they sustain any major injuries.

The above analysis could also lead you to believe that equipment failures cause more crane incidents than human error. However, the workgroup believes that human error likely played significant contributing roles in those incidents listed as being caused by equipment failure. We found that almost 75% of the reports (14 out of 19) listed the cause of the accidents as mechanical failure (several incidents are still under investigation and the specified causes could change), while human error was only listed as the cause in six of the reports (several accidents had multiple cause categories and slip/trip/fall and bad weather were listed as the causes in one report each). This percentage is almost directly inverse of what you would expect to find if you buy into the adage that 80 percent of all accidents are due to human error.

Our identification of trends in crane incidents is limited to the simple analysis discussed above. We do not believe it is possible to do a more detailed analysis because much of the information needed to conduct such an analysis is not available. While most of the forms and reports provide a very good description of the incident, many do not provide sufficient data and analysis about why the accident occurred. Information that is missing includes the experience and training of the personnel involved in the accident; operator/contractor training and maintenance programs; job procedures; condition of the equipment; and maintenance and training records. We believe that this type of information holds the key to accurately identifying the causes of many accidents.

The purpose of the above discussion is not to criticize the authors of the reports, but to point out that there is room for improvement in these reports. Right now the reports do an adequate job of telling us what happened, but they don't do a good enough job of explaining why it occurred. In our opinion, MMS must significantly improve the method of investigating, analyzing, and reporting the root and contributing causes of accidents if MMS is going to use these reports in understanding why accidents occur. We believe that MMS must rethink how it conducts accident investigations and how it reports them and not just tell the current investigators and authors of the reports to do a better job.

MMS AND USCG REQUIREMENTS FOR CRANES

MMS Requirements

MMS is responsible for the regulation of cranes, booms, and other material-handling equipment installed on fixed platforms according to the 1989 MMS/USCG Memorandum of Understanding (MOU). MMS regulates cranes by requiring lessees and operators to comply with American Petroleum Institute's Recommended Practice for the Operation and Maintenance of Offshore Cranes (API RP 2D), Third Edition, June 1, 1995. MMS incorporates this document by reference in the regulations found at 30 CFR 250.120(c), Safe and workmanlike operations.

API RP 2D provides practical guidance for the safe operation, inspection, and maintenance of pedestal-mounted cranes. It also outlines the necessary qualifications and minimum training

requirements for crane operators. MMS inspectors have used this document to establish potential incident of noncompliance (PINC) items associated with crane operations, inspection, and maintenance. MMS crane inspections are discussed in greater detail later in the document.

As noted above, MMS is also responsible for booms and other material-handling equipment on fixed platforms. Since API RP 2D only addresses pedestal-mounted cranes, MMS does not have specific regulations that address the operation of other cranes, booms, or other materials-handling equipment. MMS discussed the need for developing regulations to address this equipment for several years following the signing of the MOU and finally determined that specific regulations were not needed. In the meantime, the Pacific Region has issued a Letter to Lessees on June 5, 1996, that encourages lessees to apply the same basic inspection, maintenance, and handling practices described in API RP 2D to other cranes, booms, or other materials-handling equipment. This encouragement was proposed to become a requirement via the Notice of Proposed Rulemaking for Subpart A which was published in the Federal Register on February 13, 1998.

USCG Requirements

Under the 1989 MMS/USCG MOU, USCG is responsible for cranes, booms and other material-handling equipment installed on mobile drilling units and floating production systems that receive a Certificate of Inspection or Letter of Compliance. USCG regulates the operation and maintenance of cranes in a manner similar to MMS by referencing API RP 2D (46 CFR 109.521). USCG further requires that cranes installed on those facilities to be:

- designed in accordance to API Specification for Offshore Cranes (API Spec 2C);
- installed according to an approved crane plan; and
- inspected and load tested by USCG or an approved third party when the crane is installed, every 48 months, and following repairs or alterations to any structural component of the crane.

Under the proposed MMS/USCG MOU, the division in responsibilities for regulating cranes does not change from the current MOU. Also, USCG, like MMS, does not appear to have specific requirements for booms and other material-handling equipment in its regulations.

CRANE INSPECTIONS

The MMS National PINC List and Guidelines Book utilized by the offshore inspectors contain 20 specific crane PINC's. These PINC's and Guidelines were created by MMS, and more specifically by the National PINC Review Team. These PINC's conform with the requirements found in 30 CFR 250.120(c) and Third Edition of API RP 2D.

The workgroup conducted a query of the TIMS database to see how many Incidents of Noncompliance (INC) were issued from January, 1995 through August, 1998. The results of this query (Attachment 2) shows that a total of 165 crane related INC's were issued during this time period. As Attachment 2 illustrates, only 12 of the 20 available PINC's were cited. The most frequently cited PINC was PINC G-201, which is primarily a records PINC. In fact, with the exception of PINC G-204, all of the recorded crane INC's listed in Attachment 2 are associated with record keeping. This is not an unusual finding. With the variety of safety inspections expected to be performed in a very limited time, record checks on cranes are not only considered a legitimate type of inspection, but sometimes the only means of inspection. Aside from obvious

deficiencies that may be found during a physical inspection of a crane, MMS Inspectors must rely on the integrity of the operator and the accuracy of their required paperwork associated with qualified crane inspections and personnel training.

Unfortunately, there will probably always be cases where a breakdown of this integrity exists, such as the crane mishap investigated by the MMS Camarillo District Office around the first part of 1998. After an initial investigation was conducted, several INC's were issued and subsequently the Pacific Region filed a civil penalty against the operator. This operator had a substantial record of noncompliance over a span of about 18 months. The action initiated by the Camarillo District is still partially under appeal, however, this effort is an ideal example of how an investigation should result in the necessary action to gain attention to ongoing concerns with safety, and more specifically, with safety involving cranes.

Our workgroup was recently informed that during the third week of October, 1998, the MMS PINC Review Team will meet to discuss several PINC inspection categories. Because of the increase in incidents involving offshore cranes, the PINC team will include a portion of their agenda to discuss in detail what, if any, recommendations MMS should submit to the API committee regarding the revision or improvement of API RP 2D.

DISCUSSIONS WITH THE REGIONS

The workgroup held a teleconference with all three Regions on July 9, 1998, to discuss their thoughts and concerns about crane accidents and regulations. Senior inspectors from each Gulf of Mexico District also participated in the teleconference. Here's a summary of our discussion:

Thoughts and Concerns

- Human factors play a large role in crane accidents, the root cause of many accidents is human error
- Lack of experience can also be a factor, but serious accidents can occur even with experienced personnel
- Some of the cranes on platforms are in poor working condition
- Judgement of personnel involved in crane operations (operator, riggers, ship captain, and facility manager) may be influenced by pressure to get the job done

Regulations

- API RP 2D is a good document. Our use of RP 2D is a good example of performance based regulations.
- Potential additions or shortcomings of API RP 2D -- further define or specify minimum experience requirements for operators and riggers (we noted that there is no mention of training for persons assisting the crane operator); clarify when operator or inspector should take crane out of service; and discuss operating limits or curtailment criteria for rough sea state or poor weather conditions
- USCG regulations also use API RP 2D as the basis for their operation and maintenance requirements. USCG goes a couple of steps further by requiring the certification of cranes and third-party inspection and testing.
- MMS should examine need for certification and third party inspections
- MMS needs to reexamine our PINC's to ensure that they adequately cover API RP 2D

- A good Safety and Environmental Management Plan should cover cranes operations and address the above shortcomings

RECOMMENDATIONS

Based on the information discussed above, the workgroup believes that the following recommendations could help improve the safety of crane operations:

1. **Request API to revise API RP 2D**. We see the crane rigger as the forgotten person in API RP 2D. The rigger must be trained in general crane operations and specifically in proper load handling procedures. We recommend that the Chief, EOD, should send API a letter recommending industry to revise API RP 2D to include appropriate training guidelines for riggers. Although API RP 2D provides very good guidance for operating offshore cranes, we believe that it is deficient in its lack of discussion about crane riggers. API RP 2D provides very little guidance on the duties or appropriate formal training for riggers. It is extremely important that riggers are properly trained because they are often the ones that get injured or killed (our analysis shows that riggers are at the greatest risk to injury and death).

2. **Require third party inspections/certifications**. MMS should seriously consider requiring inspection/certification of all cranes installed on fixed platforms. This requirement could be similar to the USCG's requirements for load testing and re-certifying cranes every four years. Although some may considered this a prescriptive measure, we believe it is necessary to ensure that operators properly maintain their cranes. This action may prevent some of the incidents that occur after something fails or breaks. As shown in our simple analysis, when equipment fails (17 incidents), the results can be deadly and cause significant damage to the crane and surrounding facilities.

3. **Review the need for regulating booms and other material-handling equipment**. While this equipment is outside of the scope of our review, we believe that MMS should reevaluate how it (or if) wants to regulate this equipment. Currently, MMS proposes to regulate the operation and maintenance of this equipment used in the Pacific Region but to be silent on its in the Gulf of Mexico Region. We recommend that MMS regulate this equipment in a consistent manner.

4. **Improve accident investigations and reports**. MMS must significantly improve the way it conducts accident investigations and reports the findings if MMS wants to use the reports for understanding and analyzing why accidents occur. Right now the reports do an adequate job of telling us what happened, but they don't do a good enough job of explaining why it happened.

   If MMS is satisfied with the current program, then MMS may keep the status quo of having inspectors and engineers conduct the investigations on a part-time basis. This approach will likely provide MMS with both good reports and not so good reports, but we don't think MMS would be able to do proper trend analysis of accidents. If MMS wants real accident

investigations with data and information that you can analyze, then we recommend that MMS improve the program. One option would be to establish an office that has accident investigation as its sole purpose and hire qualified accident investigators to do the job (accident investigation and analysis should be their only job). Although this recommendation does not give immediate answers to improving crane safety, it would provide MMS with a better understanding of all accidents. Understanding why accidents happen should also give MMS another tool for measuring operator performance.

5. **Industry/MMS workshop on crane safety**. It has been suggested that MMS host or participate in an industry/MMS workshop on crane safety. We are not convinced that crane safety would stimulate sufficient interest for a full workshop. We think the best method solution to stimulate industry recognition of crane safety issues is to work with API on revising API RP 2D.

   However, if we do participate in this type of workshop, it should focus on some of the more recent accidents and lessons learned. Participants should include USCG, API, Offshore Operators Committee, International Association of Drilling Contractors, and other interested parties to discuss crane safety issues, policies and appropriate regulations. Invitations should also be extended to crane manufacturers, crane suppliers, work boat contractors, and others that move equipment and supplies to and from offshore platforms. Such a diverse group of participants could provide valuable insight for learning more about training needs for riggers and overall crane safety.

ATTACHMENT 1 - CRANE INCIDENTS FROM 1995 TO AUGUST 1998

Brief Description of the Accident	Date	Injuries/Fatalities	Damage	Report Prepared	Listed Cause
Fast line parted while unloading drillpipe	7/20/98	None	Minor damage to supply boat	No	EF
Individual fell to deck after tagline wrapped around leg as load lifted	6/20/98	Minor injury to rigger	None	No	S/T/F
Crane power-pack overturned during rigging down activity	6/2/98	1 fatality and 3 serious injuries	**	Yes	**
Boom damaged when operator pulled wrong lever	5/28/98	None	Minor damage to boom	Yes	HE
Platform crane failed while offloading a rental crane	5/10/98	2 fatalities of riggers	**	Yes	EF **
Oil storage tank on supply boat toppled during the lifting of load	4/26/98	None	400 gallons of motor oil spilled	Yes	EF/ HE
Boom damage when it was raised into boom stops	4/3/98	None	Major damage to boom	Yes	EF/ HE
Wire rope on BOP hoist broke	2/6/98	1 fatality of rigger	Broken wire rope	Yes	EF
Boom broke into 3 pieces when hoist components failed	1/15/98	None	Major damage to boom	Yes	EF
Employee pinned by personnel basket	10/26/97	1 minor injury	None	No	HE
Crane pedestal broke during lift	9/25/97	Crane operator suffered broken bones and cuts	crane and workboat damaged	Yes	EF
Load fell to deck when sling failed	9/17/97	1 fatality of rigger	Unknown	Yes	EF
Crane boom failed while offloading workover rig	7/30/97	None	Crane and platform damaged	Yes	EF

Boom pawl brake failed after boom went into free fall while making lift	4/23/97	None	Severe damage to boom	Yes	EF
Crane pedestal failed while trying to lift immovable object	4/3/97	Minor injury to operator	Major damage to crane	Yes	EF
Employee injured while offloading fluid tank from vessel	1/30/97	Minor injury to rigger	None	No	HE
Box of cuttings overturned while being offloaded onto vessel	1/24/97	None	Cuttings spilled	No	***
Sling snagged accumulator valve and blew worker across drill floor	1/18/97	1 fatality of rigger	Minor	Yes	HE/ S/T/F
Wire sling broke while offloading filter unit	1/5/97	None	Minor filter and vessel damage	Yes	HE/ EF
Slings slipped while making deck lift	12/6/96	5 riggers injured	Unknown	No	S/T/F
Worker fell out of personnel basket when it caught on air conditioning unit	10/24/96	1 injury	None	No	S/T/F/ BW
Worker injured while exiting personnel basket	10/5/96	Broken leg	None	No	S/T/F/ BW
Wire cable broke causing the counter-balance assembly to strike worker	9/17/96	Serious injury to rigger	Minor damage to crane equipment	Yes	EF
New crane operator dropped mud logging lab	8/6/96	None	Minor damage to lab	No	HE
Fast line ball struck wind wall while moving valve	7/29/96	Rigger suffered broken leg	Minor	Yes	HE
Turntable bearing case broke, allowing the boom to fall	7/19/96	None	Major damage to the crane	Yes	EF
Helicopter tail rotor struck crane that was not parked in the proper location	7/7/96	None	Minor damage to tail rotor	Yes	HE

Tank being offloaded discharged diesel when discharge valve caught on handrail	6/17/96	None	Small diesel spill	No	HE
Worker departing personnel basket injured when crane line slipped	1/2/96	Broken leg	None	No	EF
Worked killed while being lowered to detach mooring lines	6/16/95	1 fatality of rigger	None	Yes	EF
Ruptured diesel tank while offloading snubbing unit	4/21/95	None	12 bbl diesel spill and damage to tank	Yes	BW
Worker caught finger between sling shackle and pad eye	3/28/95	Rigger lost part of finger	None	No	HE
Worker's finger pinched while aligning motor and skid	2/25/95	Minor injury to rigger	None	No	Other
Load shifted and sling detached from crane hook	1/28/95	None	Minor damage to load	No	EF

34 TOTAL CRANE INCIDENTS FROM JANUARY 1995 TO AUGUST 1998

Key for Listed Causes of Incidents
EF - Equipment failure
S/T/F - Slip/trip/fall
** - Incident still under investigation
HE - Human Error
*** - Overboard drilling fluids
BW - Bad weather

ATTACHMENT 2
CRANE INC'S ISSUED NATIONWIDE
JANUARY 1995 THROUGH AUGUST 1098

PINC	DESCRIPTION	ENFORCEMENT CODE W	C
G-201	Records of inspection, testing, maintenance, operator qualifications at nearest field office.	44	7
G-203	Operator qualifications achieved by offshore experience or company training program.	1	2
G-204	Operating practices for handling, attaching, moving and holding the load being utilized.	4	4
G-207	Crane inspections performed by a qualified inspector for pre-use and results recorded.	4	7
G-208	Crane inspections performed by a qualified inspector or qualified operator monthly (50+ hrs) and results recorded.	15	1
G-209	Crane inspections performed by a qualified inspector quarterly (10+ hrs monthly) and results recorded.	17	3
G-210	Crane inspections performed by a qualified inspector annually (all cranes) and results recorded.	31	2
G-213	Cranes idle for 12 months or more given an annual inspection.	0	2
G-214	Written, dated, and signed monthly, quarterly, and annual inspection records, along with records of modifications available at the nearest facility.	12	0
G-217	Written reports available showing test procedures and confirming adequacy of repairs or alterations.	4	0
G-218	Preventative maintenance program which takes into consideration crane type, frequency of usage, history of maintenance and manufacturer's recommendations.	0	1
G-219	Written, dated, and signed maintenance records available at the facility for two years.	4	0

165 TOTAL NATIONWIDE CRANE INC'S FOR THIS PERIOD